



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,429	12/10/2003	Hako Botma	081468-0306942	5136
909	7590	11/08/2005	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			GUTIERREZ, KEVIN C	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
			2851	

DATE MAILED: 11/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/731,429

Applicant(s)

BOTMA ET AL.

Examiner

Kevin Gutierrez

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on September 9, 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Lai (6,034,805).

Regarding claim 13, Lai discloses “a plurality of redirecting elements (1,3; scan mirrors) to redirect to direct a beam of radiation (21) having a predetermined polarization state from a radiation source (col. 2, lines 53-54) to an illumination system of the lithographic apparatus, the redirecting elements being arranged to provide a minimum polarization related radiation loss wherein said beam delivery system is constructed and arranged to provide a minimum polarization related loss (col. 2, lines 21-22), wherein said beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of said redirecting elements (see Abstract; col. 3, lines 42-43).”

Regarding claims 14 and 15, Lai disclose wherein the beam (21p, 22p, 23p) and redirecting elements (1, 3) are mutually arranged such that the beam has a substantially s-polarization state relative to at least one or each of the redirecting elements (see Abstract, col. 3, lines 42-43).

Art Unit: 2851

3. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Carter (4,900,137).

Regarding claim 8, Carter discloses “a mirror element comprising a dielectric reflective layer (9) and a polarizing layer (10) to provide a predetermined polarization state of a radiation beam relative to the reflective layer so as to reflect substantially all of said radiation, the polarizing layer being integral with said dielectric reflective layer (col. 2, lines 32-33 and 37-39; lines 45-48, where the mirror composes of a multilayer dielectric layer reflective stack to reflect light in a polarized state).”

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being obvious by Carter.

Carter discloses the claimed invention except “for light having a predetermined wavelength in the range of 248-127nm.” It would have been obvious to one having ordinary skill in the art at the time the invention was made to have light having a predetermined wavelength in the range of 248-127nm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ (CCPA 1980).

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai in view of Leger (5,627,847).

Regarding claim 16, Lai teaches all of the claimed limitations except a substantially square cross-section beam of radiation.

However, having a “wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section” is routine in the art as is evident to the teaching of Leger (see Figure 3B, 120; col. 4, lines 15-17). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Lai by including a substantially square cross-section beam of radiation.

The ordinary artisan would have been motivated to modify Lai in a manner described above for at least the purpose to reduce the number of beam reflections.

7. Claims 1, 2, 7, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US 2002/0154282) in view of Lai.

Regarding claims 1 and 10, Mori discloses

- “a radiation system (10, 20, 100) to provide a projection beam of radiation ([0038], line 9),
- a support structure ([0043], lines 1-3) to support a patterning device (50; reticle) , the patterning device constructed and arranged to pattern the projection beam according to a desired pattern ([0038], lines 18-19);

- a substrate table (80) to hold a substrate (70);
- a projection system (60) to project the patterned beam onto a target portion of the substrate (70) ; said radiation system further comprising:

Mori also furthers a radiation system (10, 20, 100) with redirecting elements (110, 130; mirrors), but does not disclose “redirecting elements to redirect said beam from a radiation source to an illumination system wherein said radiation source is arranged to provide a beam having a predetermined polarization state and said redirecting elements are arranged to provide a minimum polarization related radiation loss and wherein said beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of said redirecting elements”

However, having “redirecting elements to redirect said beam from a radiation source to an illuminations system wherein said radiation source is arranged to provide a beam having a predetermined polarization state and said redirecting elements are arranged to provide a minimum polarization related radiation loss and wherein said beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of said redirecting elements”” is known to the art as it is evident by the teaching of Lai (Fig. 1, where redirecting elements (1,3) are arranged to maintain the polarization state of said radiation beam; see Abstract; col. 3, lines 42-43).” Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify radiation system of Mori to include redirecting elements constructed and arranged to maintain the polarization state of

Art Unit: 2851

the beam for at least of the purpose of providing a more sufficient polarized beam to the projection system.

Regarding claims 2 and 11, Mori discloses redirecting elements, but does not disclose “wherein said redirecting elements are dielectric mirror elements and said beam is arranged to have an s-polarization state relative to each of said mirror elements.”

However, having “wherein said redirecting elements are dielectric mirror elements and said beam is arranged to have an s-polarization state relative to each of said mirror elements” is known to the art as it is evident by the teaching of Lai (Fig. 1, where s-polarization is utilized relative to mirror elements (see Abstract, col. 3, lines 42-43). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the redirecting elements of Mori in a manner described above for at least the purpose to effectively reducing cost for productions.

Regarding claim 7, Lai further discloses “wherein each of said redirecting elements defines a plane of incidence, and wherein all planes of incidence of all redirecting elements are parallel to each other (col. 2, lines 11-14).”

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Lai, as applied to claims 1 and 10, and in further view of Leger.

Mori as modified discloses all of the claimed limitations except “wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section.”

However, having “the beam of radiation which is directed to the illumination system has a substantially square cross-section” is routine in the art as is evident to the teaching of Leger (see Figure 3B, 120; col. 4, lines 15-17). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the beam of Mori, as modified, by having a substantially square cross-section beam of radiation for at least the purpose to reduce the number of beam reflections.

9. Claims 3-6, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Lai, as applied to claims 1 and 10, and in further view of Takahara et al (US 2002/0067546).

Regarding claims 3, 4 and 17, Mori as modified discloses all of the claimed limitations except (claim 3) “wherein said beam delivery system comprises at least one polarizing plate to modify a polarization state of said radiation beam” and (claim 4) “wherein said polarizing plate is a half lambda plate”

However, having at least one polarizing plate that is a half lambda plate to modify a polarization state of said radiation beam is known to the art as it is evident by the teaching of Takahara et al (Fig. 10, where 52 is a polarizing plate that modifies direction of beam (denoted by “p” and “s”) before and after the polarizing plate; 52

Art Unit: 2851

is a half-lambda plate ([0007], line 1). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the radiation system of Mori as modified by including a half lambda plate as a polarizing plate utilized in a manner described above for at least the purpose to utilize the efficient amount of light.

Regarding claim 5, Mori as modified discloses all of the claimed limitations except “wherein said polarizing plate is integral with one of said redirecting elements.”

However, having said polarizing plate integral with one of said redirecting elements” is known to the art as it is evident by the teaching of Takahara et al (Fig. 10, where 52 and is integral with 51 (redirecting element)). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the radiation system of Takahara et al by having the polarizing plate integral with at least one of said redirecting elements for at least the purpose of providing a more substantial polarized beam.

Regarding claim 6, it would have been obvious having one of ordinary skilled at the time the invention was made to “wherein said polarizing plate is bonded to one of said redirecting elements,” since it has been held that forming in one piece and article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

10. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view Lai and Takahara et al, as applied to claims of 3-6 and 17, and in further view of Leger.

Regarding claim 18, Mori as modified discloses all of the claimed limitations except a substantially square cross-section beam of radiation.

However, having a “wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section” is routine in the art as is evident to the teaching of Leger (see Figure 3B, 120; col. 4, lines 15-17). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Mori as modified by including a substantially square cross-section beam of radiation.

The ordinary artisan would have been motivated to further modify Mori as modified in a manner described above for at least the purpose to reduce the number of beam reflections.

Regarding claims 19 and 20, Lai further discloses wherein the beam (21p, 22p, 23p) and redirecting elements (1, 3) are mutually arranged such that the beam has a substantially s-polarization state relative to at least one or each of the redirecting elements (see Abstract, col. 3, lines 42-43).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cushing (6,011,652) discloses a multilayer dielectric filter and Noguchi et al (5,652,745) disclose an optical system that utilizes polarized light.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 7:30 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571)-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



William Perkey
Primary Examiner

Kevin Gutierrez
Examiner
Art Unit 2851

November 1, 2005